1. A circuit implementing a translinear amplifier, disposed in a semiconductor substrate, intended to work linearly within a wide specified voltage range, with minimal component count, comprising

a first means for a current dividing circuit with two branches, each comprising at least one MOSFET transistor and with a common current source, where the gates of said MOSFET transistors are connected with said translinear amplifier's inputs and where the current ratio in said branches of said first current dividing circuit is dependent on said translinear amplifier's input voltage difference;

a second means for a current dividing circuit with two branches, each comprising at least one MOSFET transistor and with a common current source, where one gate of said MOSFET transistors is connected with said translinear amplifier's reference voltage and the other is connected to said translinear amplifier's output and where the current ratio in said branches of said second current dividing circuit is dependent on the voltage difference of said translinear amplifier's reference voltage and output voltage; and

means to force the current division within said first current dividing circuit and the current division within said second current dividing circuit to the same value of current ratios

2. The circuit of claim 1 wherein said means to force the current division within said first and second current dividing circuits to the same current ratio is implemented as a closed feedback loop, mainly built by a current probing element

within said first current dividing circuit and a current controlling element within said second current dividing circuit

3. The circuit of claim **2** wherein said means to force the current division within said first and second current dividing circuits to the same current ratio is provided by a MOSFET transistor within the branch of said second current dividing circuit, where the gate of said MOSFET transistor is connected to a corresponding MOSFET transistor within the branch of said first current dividing circuit and where the gates of these two transistors are connected and where, in addition, the gate of said MOSFET transistor, which is connected to said translinear amplifier's output is also connected to that same transistor's drain.

4. The circuit of claim **3** wherein said MOSFET transistors, within said means for said current dividing circuit with two branches are made of PMOS transistors and where the transistors of said means to force the current division within said first and second current dividing circuit to the same value of current ratio are made of NMOS transistors.

5. The circuit of claim **3** wherein all components are complementary to claim 4, i.e. said MOSFET transistors, within said means for said current dividing circuit with two branches are made of NMOS transistors and where the transistors of said means to force the current division within said first and second current dividing circuit to the same value of current ratio are made of PMOS transistors

6. A circuit implementing a translinear amplifier, intended to work linearly within a wide specified voltage range and to have sharp cutoff edges at the limits of said linear operating range, is achieved, comprising:

means for a translinear amplifier;

means to define the linear operating range

means to sharply cut off said translinear amplifier's linear operation, once the defined linear operating range is exceeded at the negative end of said linear operating range; and

means to sharply limit said translinear amplifier's linear operation, once the linear operating range is exceeded at the positive end of said linear operating range.

7. The circuit of claim **6** wherein said means to define the linear operating range compares the current of said current dividing circuits and, as long as the ratio does not exceed certain values, continues to operate linearly.

8. The circuit of claim **6** wherein said means to sharply cut off said translinear amplifier's linear operation, compares the current of said current dividing circuits and, if the ratio exceeds certain values, generate a signal to sharply raise said translinear amplifier's (negative) output voltage.

9. The circuit of claim **8** wherein said means to compare the currents is made by taking a current sample from one side of the current dividing circuit and, if the ratio

exceeds a specified value, drawing more current from the translinear amplifier's output than that branch of said current dividing circuit can drive at this time, thus forcing the output to raise drastically.

10. The circuit of claim **7** wherein said means to define the linear operating range defines a specific current ratio as the linear range limits, for example a current ration of 1 to 8, could define the limit.

11. The circuit of claim **6** wherein said means to sharply limit said translinear amplifier's output voltage uses the limiting effect of the supply voltage effect as a purposely design element.

12. The circuit of claim **1** wherein said first and second current dividing circuit have the same current.

13. The circuit of claim **1** wherein said first and second current dividing circuit have different currents

14. A circuit implementing a translinear amplifier, intended to save power whenever it operates outside the limits of an active operating range, is achieved, comprising:

means for a translinear amplifier;

means to define said active operating range of said translinear amplifier; and

means to switch off most of the circuit elements to reduce the power consumption when the translinear amplifier itself is outside said active operating range.

15. The circuit of claim **14** wherein said means to define said active operating range verifies the inputs on both said branches on said first current dividing circuit to operate within their active working range.

16. The circuit of claim **14** wherein said means to define said active operating range mirrors a current probe on both sides of said first current balancing circuit and, as soon as either current falls below a certain limit, switches off most of the circuit elements to reduce the power consumption.

17. The circuit of claim **16** wherein said means to switch off most of the circuit elements to reduce the power consumption when the translinear amplifier is outside said active operating range, switches off said second current balancing circuit.

18. The circuit of claim **17** wherein said means to switch off most of the circuit elements to reduce the power consumption when the translinear amplifier is outside said active operating range, has its switching element in series with the

current source of said second current balancing circuit, to completely switching off said second current balancing circuit.

19. A circuit to compensate the temperature error of a P-MOS output stage which is attached to the translinear amplifier's output is achieved, comprising;

means for a translinear amplifier;

means of an output stage attached to said translinear amplifier, comprising a P-MOS input transistor at its input stage;

means for a reference element, comprising one or more P-MOS transistors,

means for a constant current source; and

means to connect the resulting reference voltage to said translinear amplifier's reference input.

20. A circuit of claim **19** wherein said means for a reference element compensates the temperature error of said means of an output stage attached to said translinear amplifier, comprising a P-MOS transistor at its input stage;

21. A circuit of claim **19** wherein each of said N-MOS type transistors within said means of an output stage attached to said translinear amplifier and within said means for a reference element, is replaced by their complementary P-MOS types.

22. A method to amplify signals with a translinear amplifier and intended to work linearly within a wide specified voltage range, with minimal component count,

comprising a first means for a current dividing circuit with two branches, each comprising at least one MOSFET transistor and with a common current source, where the gates of said MOSFET transistors are connected with said translinear amplifier's inputs and where the current ratio in said branches of said first means for a current dividing circuit is dependent on said translinear amplifier's input voltage difference, comprising a second means for a current dividing circuit with two branches, each comprising at least one MOSFET transistor and with a common current source, where one gate of said MOSFET transistors is connected with said translinear amplifier's reference voltage and the other is connected to said translinear amplifier's output and where the current ratio in said branches of said second means for a current dividing circuit is dependent on the voltage difference of said translinear amplifier's reference voltage and output voltage and comprising means to force the current division within said first current dividing circuit and the current division within said second current dividing circuit to the same value of current ratio;

dividing the current between two branches of a first current dividing circuit depending on the differential voltage at said first current dividing circuit

dividing the current between two branches of a second current dividing circuit, depending on the differential voltage at said second current dividing circuit

forcing the current division within said first current dividing circuit and said second current dividing circuit to the same value of current ratios

23. The method of claim **22** wherein forcing said current division within said first and said second current dividing circuit to the same value of current ratios is primarily operating as a closed feedback loop.

24. The method of claim **22** wherein forcing said current division within said first and said second current dividing circuit to the same value of current ratios is performed by probing the current in one branch of said first current dividing circuit and feeding said voltage probe to a current controlling element in the same referenced branch of said second current dividing circuit and thus forcing to react until differential voltage between Vref and Vout at said second current dividing circuit is the same as the differential voltage between Vin-p and Vin-n at said first current dividing circuit.

25. The method of claim **23** wherein forcing said current division within said first and said second current dividing circuit to the same value of current ratios is provided by connecting the gates of a MOSFET transistor within the branch of said second current dividing circuit, where the gate of said MOSFET transistor is connected to said translinear amplifier's output and a corresponding MOSFET transistor within the branch of said first current dividing circuit; which forces the currents in these branches are the same, and, if the currents provided by the current sources of the two current dividing circuits are identical, the current ratios within each co said current dividing circuit must be the same.

26. . A method for a translinear amplifier to work linearly within a wide specified voltage range and to have sharp cutoff edges at the limits of said linear operating range, is achieved, comprising:

providing means for a translinear amplifier, means to define the linear operating range, means to sharply raise said translinear amplifier's (negative) output voltage, outside the linear operating range, means to sharply limit said translinear amplifier's (positive) output voltage outside the linear operating range; and means to switch off most of the circuit elements to reduce the power consumption when the translinear amplifier itself is outside said linear operating range;

amplifying the translinear amplifier's input signal in a defined wide linear operating range;

sharply cutting off said translinear amplifier's linear operation, outside the linear operating range on one side; and

sharply limiting said translinear amplifier's linear operation outside the linear operating range on the other side.

27. The method of claim **26,** to sharply cut off said translinear amplifier's linear operation, compares the current of both branches of said current dividing circuits and, if the ratio exceeds certain values, generates a signal to sharply raise said translinear amplifier's (negative) output voltage.

28. The method of claim **26** uses the limiting effect of the supply voltage to sharply limit said translinear amplifier's output voltage as a purposely design function.

29. A method, intended to save power whenever a translinear amplifier operates outside the limits of an active operating range, is achieved, comprising:

providing means for a translinear amplifier, means to define said active operating range of said translinear amplifier; and means to switch off most of the circuit elements to reduce the power consumption when the translinear amplifier itself is outside said active operating range;

defining the active operating range of said translinear amplifier and

switching off most of the circuit elements to reduce the power consumption when the translinear amplifier itself is outside said active operating range

30. The method of claim **29** wherein defining said active operating range verifies the inputs on both said branches on said first current dividing circuit to still operate within their active working range.

31. The method of claim **29** wherein defining said active operating range mirrors a current probe on both sides of said first current balancing circuit and, as soon as either current falls below a certain limit, switches off most of the circuit elements to reduce the power consumption.

32. The method of claim **29** wherein switching off most of the circuit elements to reduce the power consumption when the translinear amplifier is outside said active operating range, switches off said second current balancing circuit.

33. A method to compensate the temperature error of a P-MOS output stage which is attached to the translinear amplifier's output is achieved, comprising;

providing means for a translinear amplifier, means of an output stage attached to said translinear amplifier, comprising a P-MOS input transistor at its input stage, means for a reference element, comprising one or more P-MOS transistors, means for a constant current source and means to connect the resulting reference voltage to said translinear amplifier's reference input;

compensating the temperature error inherent to said attached P-MOS input transistor with the same temperature characteristics inherent to said reference element's P-MOS transistor.